

## Claims

[c1] 1. A method for forming an elongated fused quartz article comprising the steps of:

- a) feeding a generally quartz ( $\text{SiO}_2$ ) material into a furnace;
- b) fusing the quartz ( $\text{SiO}_2$ ) material in a melting zone of the furnace under a gas atmosphere comprising a molecular deuterium ( $\text{D}_2$ ) gas;
- c) drawing the article from the furnace; and
- d) optionally, baking the article in a gas atmosphere comprising a deuterium gas.

[c2] 2. The method of claim 1 further comprising the step of heat treating the article drawn from the furnace in a substantially hydrogen-free gas atmosphere or vacuum.

[c3] 3. The method of claim 1 wherein the gas atmosphere of steps b) or d) further comprises an inert gas or a mixture of inert gases.

[c4] 4. The method of claim 3 wherein the  $\text{D}_2$  gas and inert gas or mixture of inert gases are present in a volume ratio of about 20%  $\text{D}_2$  and about 10% inert gas or mixture of inert gases.

[c5] 5. The method of claim 3 wherein the  $\text{D}_2$  gas and inert gas or mixture of inert gases are present in a volume ratio of about 90%  $\text{D}_2$  and about 10% inert gas or mixture of inert gases.

[c6] 6. The method of claim 3 wherein the dew point of the gas atmosphere of step b) is about  $-30^\circ\text{C}$ . to about  $80^\circ\text{C}$ .

[c7] 7. The method of claim 3 wherein the dew point of the gas atmosphere of step b) is about  $-20^\circ\text{C}$ . to about  $10^\circ\text{C}$ .

[c8] 8. The method of claim 1 being a continuous process.

[c9] 9. The method of claim 1 wherein the article is a deposition tube.

[c10] 10. The method of claim 1 wherein the article is a sleeve tube.

[c11] 11.The method of claim 9 wherein the deposition tube has a hydrogen content of about  $5 \times 10^{-11}$  mol/g to about  $5 \times 10^{-8}$  mol/g.

[c12] 12.The method of claim 1 wherein the baking is carried out at a temperature of about 200 ° C. to about 1500 ° C.

[c13] 13.A method for forming an elongated fused quartz article comprising the steps of:  
a)pretreating a generally quartz ( $\text{SiO}_2$ ) material in a gas atmosphere comprising a molecular deuterium ( $\text{D}_2$ ) gas;  
b)feeding the pretreated quartz ( $\text{SiO}_2$ ) material into a furnace;  
c)fusing the pretreated quartz ( $\text{SiO}_2$ ) material in a melting zone of the furnace under a gas atmosphere comprising a molecular deuterium ( $\text{D}_2$ ) gas or a substantially hydrogen-free gas;  
d)drawing the fused  $\text{SiO}_2$  material article from the furnace to form the article;  
and  
e)heat treating the drawn article in a substantially hydrogen-free gas atmosphere or vacuum.

[c14] 14.The method of claim 13 being a continuous process.

[c15] 15.The method of claim 13 wherein the article is a deposition tube.

[c16] 16.The method of claim 13 wherein the article is a sleeve tube.

[c17] 17.The method of claim 13 further comprising the step of :  
e)baking the fused  $\text{SiO}_2$  article in a gas atmosphere comprising a deuterium gas.

[c18] 18.A method for forming a fused quartz article comprising the steps of:  
a)providing a generally quartz ( $\text{SiO}_2$ ) material; and  
b)fusing the quartz ( $\text{SiO}_2$ ) material in a gas atmosphere comprising a molecular deuterium ( $\text{D}_2$ ) gas to form the quartz article.

[c19] 19.The method of claim 18 wherein the gas atmosphere further comprises an inert gas or a mixture of inert gases.

[c20] 20.The method of claim 18 further comprising the step of:  
c)heat treating the fused  $\text{SiO}_2$  article in a substantially hydrogen-free gas atmosphere.

[c21] 21.The method of claim 20 wherein the heat treating is carried out at about 200 ° C. to about 1500 ° C.

[c22] 22.The method of claim 18 wherein the article is a deposition tube.

[c23] The method of claim 18 wherein the article is a sleeve tube.